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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/488,973	01/20/2000	Chris Parfeniuk	H057-002	5174

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EXAMINER

COLLINS, DEVEN M

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 04/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/488,973

Applicant(s)

PARFENIUK ET AL.

Examiner

D. M. Collins

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-17 and 19-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-17 and 19-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 2823

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 10, 16-17, 21-23, 26-27, 29-31 and 33-35 are rejected under 35 U.S.C. 102(b) as being unpatentable over Demaray et al. (5,799,860, dated 9/1/98).

Demaray et al. show the method as claimed in the Figures 1-12 with corresponding text.

In re claim 10, Demaray et al. disclose a method of bonding 200 a physical vapor deposition target material 14 to a backing plate material 12, comprising:
joining the target material 14 and backing plate material 12 in physical contact with one another;
and thermally treating the joined target 14 and backing plate 12 materials to simultaneously diffusion bond 200 the target material 14 to the backing plate 12 material and develop grains in the target material 14, the diffusion bonding 200 comprising solid state diffusion between the backing plate 12 and target materials 14, a predominate portion of the developed grains having a maximum dimension of less than 100 microns.

Art Unit: 2823

In re claim 16, Demaray et al. disclose the method of claim 10 wherein the backing plate material 12 to comprises a same predominate component as the target material 14.

In re claim 17, Demaray et al. disclose the method of claim 10 wherein the backing plate material 12 comprises a same predominate element as the target material 14.

In re claim 21, Demaray et al. disclose the method of claim 10 further comprising, before the joining, work-hardening the target material 14.

In re claim 22, Demaray et al. disclose the method of claim 10 further comprising, before the joining, work-hardening the target material 14 by compressing the target material 14 from an initial thickness to a final thickness, the final thickness being less than or equal to about 40% of the initial thickness.

In re claim 23, Demaray et al. disclose the method of claim 10 further comprising, before the joining, work-hardening the target material 14 by compressing the target material 14 from an initial thickness to a final thickness, the final thickness being from about 40% to about 2% of the initial thickness.

In re claim 26, Demaray et al. disclose a method of forming a physical vapor deposition target 14 bonded to a backing plate 12, comprising:

joining a physical vapor deposition target material 14 and backing plate material 12 in physical contact with one another, the physical vapor deposition target 14 and backing plate materials 12 both comprising aluminum; and thermally treating the joined physical vapor deposition target 14 and backing plate 12 materials under an atmosphere which is inert relative to reaction with the

Art Unit: 2823

physical vapor deposition target 14 and backing plate 12 materials, the thermally treating simultaneously diffusion bonding 200 the physical vapor deposition target material 14 to the backing plate material 12 and developing grains in the physical vapor deposition target material 14, the diffusion bonding 200 comprising solid state diffusion between the backing plate material 12 and the physical vapor deposition target material 14 to adhere the physical vapor deposition target material to the backing plate material with a bond strength of at least about 5000 pounds/inch, and a predominate portion of the grains developed in the target material 14 being less than 100 microns in maximum dimension after the thermally treating of the target 14 and backing plate materials 12.

In re claim 27, Demaray et al. disclose the method of claim 26 wherein the backing plate material 12 and physical vapor deposition target material 14 both predominately comprise aluminum.

In re claim 29, Demaray et al. disclose the method of claim 26 wherein the thermally treating comprises maintaining the joined physical vapor deposition target material 14 and backing plate material 12 at a temperature of from about 280°C to about 400 ° for a time of from about 20 minutes to about 60 minutes and pressing the joined physical vapor deposition target 14 and backing plate materials 12 to a pressure of at least 12,500 pounds/in during at least part of the time that the temperature is maintained.

Art Unit: 2823

In re claim 30, Demaray et al. disclose the method of claim 29 further comprising cooling the joined physical vapor deposition target 14 and backing plate materials 12 with a liquid after the temperature treatment.

In re claim 31, Demaray et al. disclose the method of claim 29 further comprising cooling the joined physical vapor deposition target 14 and backing plate materials 12 with a gas after the temperature treatment.

In re claim 33, Demaray et al. disclose the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material 14.

In re claim 34, Demaray et al. disclose the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material 14 by compressing the physical vapor deposition target material 14 from an initial thickness to a final thickness, the final thickness being less than or equal to about 40% of the initial thickness.

In re claim 35, Demaray et al. disclose the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material 14 by compressing the physical vapor deposition target material 14 from an initial thickness to a final thickness, the final thickness being from about 40% to about 2% of the initial thickness.

Art Unit: 2823

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 11-15, 19-20, 24-25, 28, 32, and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Demaray et al. (5,799,860, dated 9/1/98) in view of Masuda et al. (5,807,443, dated 9/15/98).

Demaray et al. show as stated above in 35 U.S.C. 102.

However, Demaray et al. does not show grain recrystallization.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Demaray et al. in view of Masuda et al. to include the grain recrystallization in an effort to better sputter materials into semiconductive material substrate vias utilizing diffusion bonding.

In re claim 11, Masuda et al. disclose the method of claim 10 wherein all of the developed grains (col. 7, par. 2) have the maximum dimension of the less than 100 microns.

Art Unit: 2823

In re claim 12, Masuda et al. disclose the method of claim 10 wherein the maximum dimension of the predominate portion of the developed grains (col. 7, par. 2) is less than or equal to about 50 microns.

In re claim 13, Masuda et al. disclose the method of claim 12 wherein all of the developed grains (col. 7, par. 2) have the maximum dimension of the less than or equal to about 50 microns.

In re claim 14, Masuda et al. disclose the method of claim 10 wherein the maximum dimension of the predominate portion of the developed grains (col. 7, par. 2) is from about 30 microns to less than 100 microns.

In re claim 15, Masuda et al. disclose the method of claim 14 wherein all of the developed grains (col. 7, par. 2) have the maximum dimension of from about 30 microns to less than 100 microns.

In re claim 19, Masuda et al. disclose the method of claim 10 wherein the grain development comprises recrystallization of grains (col. 7, par. 2) within the target material (T1, T6).

In re claim 20, Masuda et al. disclose the method of claim 10 wherein the grain development comprises growth of grains (col. 7, par. 2) within the target material (T1, T6).

In re claim 24, Masuda et al. disclose the method of claim 10 further comprising, before the is joining, work-hardening the target material (T1, T6), and wherein the grain development comprises recrystallization of grains (col. 7, par. 2) from the work-hardened material.

Art Unit: 2823

In re claim 25, Masuda et al. disclose the method of claim 10 further comprising, before the joining, work-hardening the target material (T1, T6), and wherein the grain development comprises:

recrystallization of grains from the work-hardened material; and growth of the recrystallized grains (col. 7, par. 2).

In re claim 28, Masuda et al. disclose the method of claim 26 wherein the grain development comprises recrystallization of grains (col. 7, par. 2) within the physical vapor deposition target material (T1, T6).

In re claim 32, Masuda et al. disclose the method of claim 26 wherein the grain development comprises growth of grains (col. 7, par. 2) within the physical vapor deposition target material (T1, T6).

In re claim 36, Masuda et al. disclose the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material (T1, T6), and wherein the grain development comprises recrystallization of grains (col. 7, par. 2) from the work-hardened material.

In re claim 37, Masuda et al. disclose the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material (T1, T6), and wherein the grain development comprises:

recrystallization of grains (col. 7, par. 2) from the work-hardened material; and growth of the recrystallized grains (col. 7, par. 2).

Art Unit: 2823

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Deven M. Collins whose telephone number is (703) 305-7840.

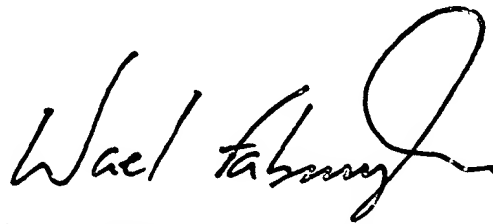
The examiner can normally be reached on Monday-Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy, can be reached on (703) 308-4918. The fax phone number for this Group is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

DMC

March 22, 2002

A handwritten signature in black ink, appearing to read 'Wael Fahmy', with a large, stylized loop at the end.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800